WHAT IS CLAIMED IS:

1. An image processing apparatus for performing a dynamic range compression processing to an arbitrary image to add a high frequency component obtained based on the image, the image processing apparatus comprising:

conversion means for converting the magnitude of the amplitude of said added high frequency component based on the magnitude of the high frequency component.

2. An image processing apparatus for performing a dynamic range compression processing to an arbitrary image to add a high frequency component obtained based on the image, the image processing apparatus comprising:

conversion means for converting the magnitude of the amplitude of said added high frequency component based on the pixel value of said arbitrary image.

3. An apparatus according to Claim 1, wherein said arbitrary image includes any one of an original image, an image obtained by applying a gradation conversion processing to the original image, an image obtained by applying a smoothing processing to the original image, and an image obtained by applying both the smoothing processing and the gradation conversion processing to the original image.

4. An apparatus according to Claim 3, wherein said smoothing processing includes a processing which uses morphological filter calculation.

5   5. An apparatus according to Claim 1, wherein said high frequency component includes a high frequency component obtained from any one of the original image of said arbitrary image, and an image obtained by applying a gradation conversion processing to the
10   original image of said arbitrary image.

6. An apparatus according to Claim 1, further comprising gradation conversion means for performing a gradation conversion processing to the image to which
15   the converted high frequency component obtained by said conversion means is added.

7. An image processing apparatus comprising: gradation conversion means for converting the
20   gradation of an original image; smoothing means for obtaining a smoothed image from the gradation-converted image obtained by said gradation conversion means; high frequency component generation means for
25   obtaining a difference between the smoothed image obtained by said smoothing means and the gradation-converted image obtained by said gradation conversion

means as a high frequency component;

conversion means for converting the high frequency component obtained by said high frequency component generation means dependent on the magnitude of the

5   amplitude of the high frequency component; and

high frequency component addition means for adding the converted high frequency component obtained by said conversion means to the gradation-converted image obtained by said gradation conversion means.

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8.   An image processing apparatus comprising:

smoothing means for obtaining a smoothed image from an original image;

high frequency component generation means for

15   obtaining a difference between the smoothed image obtained by said smoothing means and said original image as a high frequency component;

conversion means for converting the high frequency component obtained by said high frequency component

20   generation means dependent on the magnitude of the amplitude of the high frequency component;

gradation conversion means for converting the gradation of said original image; and

high frequency component addition means for adding

25   the converted high frequency component obtained by said conversion means to the gradation-converted image obtained by said gradation conversion means.

9. An image processing apparatus comprising:

smoothing means for obtaining a smoothed image from an original image;

high frequency component generation means for obtaining a difference between the smoothed image obtained by said smoothing means and said original image as a high frequency component;

conversion means for converting the high frequency component obtained by said high frequency component generation means dependent on the magnitude of the amplitude of the high frequency component;

gradation conversion means for converting the gradation of the smoothed image obtained by said smoothing means; and

high frequency component addition means for adding the converted high frequency component obtained by said conversion means to the gradation-converted smoothed image obtained by said gradation conversion means.

10. An image processing apparatus comprising:

smoothing means for obtaining a smoothed image from an original image;

high frequency component generation means for obtaining a difference between the smoothed image obtained by said smoothing means and said original image as a high frequency component;

conversion means for converting the high frequency

component obtained by said high frequency component
generation means dependent on the magnitude of the
amplitude of the high frequency component;

high frequency component addition means for adding

5   the converted high frequency component obtained by said
conversion means to said original image; and

gradation conversion means for converting the
gradation of the image after the high frequency
component addition obtained by said high frequency

10   component addition means.

11.   An apparatus according to Claim 1, wherein
said conversion means converts said high frequency
component so that the increase ratio of the absolute

15   value of the converted high frequency component
monotonously increases with the increase of the
absolute value of said high frequency component.

12.   An image processing apparatus comprising:

20   gradation conversion means for converting the
gradation of an original image;

smoothing means for obtaining a smoothed image
from the gradation-converted image obtained by said
gradation conversion means;

25   high frequency component generation means for
obtaining a difference between the smoothed image
obtained by said smoothing means and the gradation-

converted image obtained by said gradation conversion
means as a high frequency component;

conversion means for converting the high frequency
component obtained by said high frequency component

5   generation means dependent on the magnitude of a pixel
value; and

high frequency component addition means for adding
the converted high frequency component obtained by said
conversion means to the gradation-converted image

10 obtained by said gradation conversion means.

13.   An image processing apparatus comprising:
smoothing means for obtaining a smoothed image
from an original image;

15 high frequency component generation means for
obtaining a difference between the smoothed image
obtained by said smoothing means and said original
image as a high frequency component;

conversion means for converting the high frequency

20 component obtained by said high frequency component
generation means dependent on the magnitude of a pixel
value;

gradation conversion means for converting the
gradation of said original image; and

25 high frequency component addition means for adding
the converted high frequency component obtained by said
conversion means to the gradation-converted image

obtained by said gradation conversion means.

14. An image processing apparatus comprising:

smoothing means for obtaining a smoothed image

5   from an original image;

high frequency component generation means for

obtaining a difference between the smoothed image

obtained by said smoothing means and said original

image as a high frequency component;

10   conversion means for converting the high frequency

component obtained by said high frequency component

generation means dependent on the magnitude of a pixel

value;

gradation conversion means for converting the

15   gradation of the smoothed image obtained by said

smoothing means; and

high frequency component addition means for adding

the converted high frequency component obtained by said

conversion means to the gradation-converted image

20   obtained by said gradation conversion means.

15. An image processing apparatus comprising:

smoothing means for obtaining a smoothed image

from an original image;

25   high frequency component generation means for

obtaining a difference between the smoothed image

obtained by said smoothing means and said original

image as a high frequency component;

conversion means for converting the high frequency component obtained by said high frequency component generation means dependent on the magnitude of a pixel

5   value;

high frequency component addition means for adding the converted high frequency component obtained by said conversion means to said original image; and

gradation conversion means for converting the

10   gradation of the image after the high frequency component addition obtained by said high frequency component addition means.

16. An apparatus according to Claim 7, wherein

15   said smoothing means obtains said smoothed image by morphological filter calculation.

17. An image processing method for performing a dynamic range compression processing to an arbitrary

20   image to add a high frequency component obtained based on the image, the image processing method comprising:

a converting step of converting the magnitude of the amplitude of said added high frequency component based on the magnitude of the high frequency component.

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18. An image processing method for performing a dynamic range compression processing to an arbitrary

image to add a high frequency component obtained based on the image, the image processing method comprising:

a converting step of converting the magnitude of the amplitude of said added high frequency component

5   based on the pixel value of said arbitrary image.

19. A method according to Claim 17, wherein said arbitrary image includes any one of an original image, an image obtained by applying a gradation conversion

10   processing to the original image, an image obtained by applying a smoothing processing to the original image, and an image obtained by applying both the smoothing processing and the gradation conversion processing to the original image.

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20. A method according to Claim 19, wherein said smoothing processing includes a processing which uses morphological filter calculation.

20   21. A method according to Claim 17, wherein said high frequency component includes a high frequency component obtained from any one of the original image of said arbitrary image, and an image obtained by applying a gradation conversion processing to the

25   original image of said arbitrary image.

22. A method according to Claim 17, further

comprising a gradation converting step of performing a gradation conversion processing to the image to which the converted high frequency component obtained by said converting step is added.

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23. A method according to Claim 18, wherein said converting step includes a step of converting said high frequency component so that the increase ratio of the absolute value of the converted high frequency

10 component monotonously increases with the increase of the absolute value of said high frequency component.

24. An image processing method for performing a dynamic range compression processing to an image

15 obtained by performing gradation conversion to an original image to add the high frequency component of the original image or the high frequency component of the image obtained by performing gradation conversion to the original image, the image processing method

20 comprising the steps of:

converting the magnitude of the amplitude of said added high frequency component based on the magnitude of the high frequency component.

25 25. An image processing method for performing a dynamic range compression processing to an image obtained by performing gradation conversion to the

smoothed image of an original image to add the high

frequency component of the original image, the image

processing method comprising the steps of:

converting the magnitude of the amplitude of said

5   added high frequency component based on the magnitude

of the high frequency component.

26. An image processing method for performing a

dynamic range compression processing to an original

10   image or the smoothed image of the original image to

add the high frequency component of the original image

and perform gradation conversion, the image processing

method comprising the steps of:

converting the magnitude of the amplitude of said

15   added high frequency component in accordance with the

magnitude of the high frequency component.

27. An image processing method for performing a

dynamic range compression processing to an image

20   obtained by performing gradation conversion to an

original image to add the high frequency component of

the original image or the high frequency component of

the image obtained by performing the gradation

conversion to the original image, the image processing

25   method comprising the steps of:

converting the magnitude of the amplitude of said

added high frequency component in accordance with the

magnitude of a pixel value.

28. An image processing method for performing a
dynamic range compression processing to an image
5 obtained by performing gradation conversion to the
smoothed image of an original image to add the high
frequency component of the original image, the image
processing method comprising the steps of:

converting the magnitude of the amplitude of said
10 added high frequency component in accordance with the
magnitude of a pixel value.

29. An image processing method for performing a
dynamic range compression processing to an original
15 image or the smoothed image of the original image to
add the high frequency component of the original image
and perform gradation conversion, the image processing
method comprising the steps of:

converting the magnitude of the amplitude of said
20 added high frequency component in accordance with the
magnitude of a pixel value.

30. A memory medium for storing a computer-
readable program of an image processing apparatus for
25 performing a dynamic range compression processing to an
arbitrary image to add a high frequency component
obtained based on the image, the computer program

comprising the steps of:

converting the magnitude of the amplitude of said added high frequency component based on the magnitude of the high frequency component.